

EAO HMI Systems

Production Capabilities North America.

www.eao.com



Sharing experiences. *Creating interactions.*

Since 1947, our product innovation has been based on a thorough understanding of the end users *and on our fascination with making interactions between humans and machines possible.*

EAO develops impressive, customized HMI Systems that feature innovative technology, intuitive operation and reliable functions.

EAO HMI Systems are of an outstanding quality in order to meet any requirement. Our engineering services also include the combining of customer-specific components outside of EAO's product range. As an expert in mixed-technology solutions, we create optimal solutions for our customers saving them both time and money. Here, we have global supply chain experience at our disposal, and can draw on our expertise in process optimization and EAO's risk management system.

We meet not only every possible functional and ergonomic end user requirement, but also all market- and country-specific standards. We also possess all the necessary certifications and approvals.

Our HMI solutions offer the lowest total cost of ownership. EAO customers benefit from extensive savings in terms of money and time, as well as extremely long-term availability of our products and systems.

As a successful company with production sites around the world, EAO is actively committed to the effective implementation of a sustainable environmental policy. Our ISO 14001 certification for environmentally friendly management is something we are committed to and passionate about.

Your benefits as an EAO customer:

- EAO is your HMI expert – including mixed-technology solutions
- Efficient system solutions – tailored to your needs
- You save time and money – thanks to reduced interfaces
- Global service – around the world
- Sustainability – an integral part of our consultation service



5 x 360 degrees.

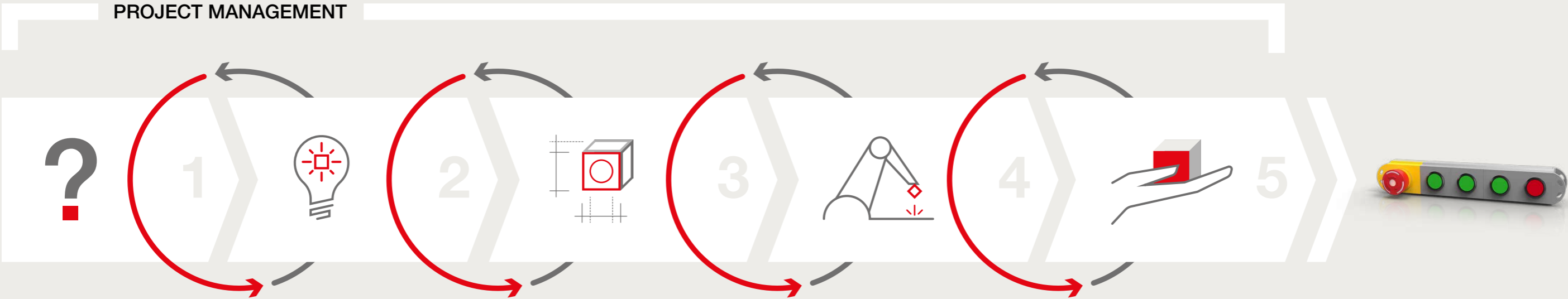
Thorough and complete project management.

We provide you with what you need: innovative, intuitive and reliable HMI System solutions, with qualified services through to the end of a product’s life cycle – and beyond.

As an expert partner, we offer you effective and efficient planning and design. Our global network of qualified suppliers in combination with our vast materials expertise results in optimized purchasing, production and logistics. Based on our comprehensive technical knowledge, we reduce unnecessary

interfaces and guarantee precise project implementation. This ultimately enables the end-user to work intuitively. Cost-effective project management is supported via long-term service and the documenting of all technically and commercially relevant and necessary information.

EAO project management – holistic systems thinking



Phase 1 <i>Initialization</i> <ul style="list-style-type: none">▪ Customer request▪ Analyse customer requirements▪ Risk and potential assessment▪ Start phase 2	Phase 2 <i>Pre-study and concept</i> <ul style="list-style-type: none">▪ Official project kick-off▪ Pilot study▪ Quotation for product and project▪ Start phase 3	Phase 3 <i>Realization</i> <ul style="list-style-type: none">▪ FMEA▪ Development of prototype▪ Release for prototype▪ Start phase 4	Phase 4 <i>Prototype</i> <ul style="list-style-type: none">▪ Supply of tools and material▪ Produce prototypes▪ Release testing and design freeze▪ Start phase 5	Phase 5 <i>Zero Series and Series manufacturing</i> <ul style="list-style-type: none">▪ Supply of material▪ Produce and release zero Series▪ Lessons learned▪ End of project	Series production <i>Delivery of Series products</i> <ul style="list-style-type: none">▪ Product ramp-up▪ Product ramp-down▪ Obsolescence management
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Target-focused.

With commitment and efficiency.

HMI design and ergonomics



The starting point for optimal HMI solutions is a thorough understanding of best design practices, ergonomics and manufacturing standards.

The positioning of components, legend size and color, or the configuration of emergency stop switches and protection guards affect ease of use, efficiency, safety and cost.

- HMI System design and layout that is functional and intuitive
- Ability to match your overall system appearance – color, graphics, etc.
- Knowledge of safety, ergonomic, industry and international standards

We ensure that your HMI solution meets all the criteria for your sector.

Software and interface design



Modern HMI solutions have embedded interfaces that link them with the larger system through software-controlled communication connections.

EAO has extensive experience with on-board microcontrollers, real-time operating systems and encryption technology for PIN-protected, secure access, as well as a variety of communication protocols, including:

- CAN-Bus, CANopen, CAN-J1939, ProfiBus, InterBus, DeviceNet, ASI-Bus
- USB, Ethernet, RS-232, RS-485
- GUI touchscreen integration

The interaction is our task and our objective.

Manufacturing and HMI expertise



As a worldwide manufacturer of HMI Components, our expertise in prototyping, tooling, plastics moulding, plating, electrical design, automation and precision-parts assembly is unsurpassed.

To develop innovative, application-oriented solutions that add significant value to end products, we offer our customers the appropriate expertise:

- Expert engineers, designers and toolmakers
- High-quality and reliable HMI Components
- Lean production knowledge
- Technology review and obsolescence management
- Conformance with CE, UL, CUL, VDE, RoHS, WEEE and other standards
- Environmental Management System ISO 14001

We offer you the full spectrum of HMI services.

Production and supply chain



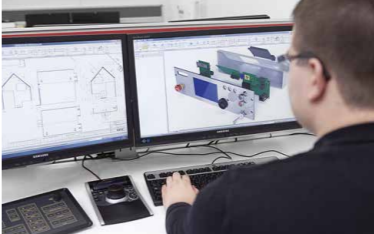
EAO supports you in taking advantage of local production while strengthening your global supply chain.

Our four global production companies and planning centers in Europe, Asia and North America ensure the planning and production of HMI products to ISO 9001 and other international standards.

- Consistent processes at all locations, with integrated supply chain quality measures
- PCB design and manufacturing
- SMT placement, assembly and inspection
- Cable crimping, cutting, harnessing and final assembly

From the initial processing through to the final integration of complete HMI solutions.

Mechanical and electrical system design



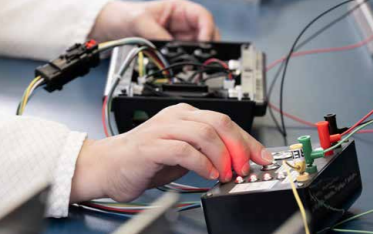
Once specifications have been approved, including components, panel layout and integration, they form the basis for mechanical and electrical system design.

EAO works closely with you to prepare detailed drawings, parts lists, circuit schematics and assembly instructions. Production schedules are agreed upon before manufacturing commences. EAO helps you cut development times using rapid prototyping techniques for plastic components and PCBs.

- 3D CAD/CAM/CAE (Solid Edge, AutoCAD, Pro/ENGINEER and SolidWorks)
- PCB design and simulation software (P-CAD, Altium)
- Gerber file generation for PCB manufacturing
- Rapid prototyping (3D Printing)

Thanks to our optimized production-sequence planning, you will get your product to market faster.

Quality assurance and testing



EAO has a dynamic total quality management system linked to all areas of our business.

Our products and systems undergo rigorous testing to assure reliability, repeatability and a long service life.

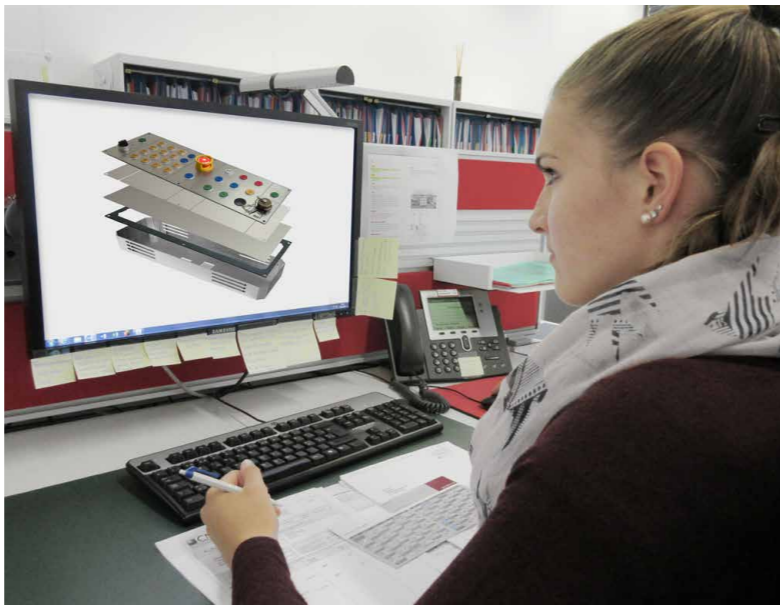
- Laboratory tests with special software (e.g. LAB View)
- Environmental test chambers (temperature and humidity)
- Checking of compliance to different degrees of protection
- Testing the durability of individual components
- Optical and X-ray analyses
- Final inspection on all systems

We are certified and managed to the standards governing the markets we serve.

Highest standards guaranteed.

Your HMI expert partner.

At EAO, quality is a case not only of our individual products but also the entire value-creation process. Our certified quality management system ensures that our customers can rely on our products and services.



Automating components and production processes

With decades of experience as a global provider, we have the knowledge and products to satisfy our customers' requirements and quality expectations.

CAD and rapid prototyping

EAO works with you to prepare detailed drawings, circuit schematics, production processes, inspection plans and assembly instructions. We help you significantly reduce development times with the aid of rapid prototyping techniques for your components and PCBs.

Software and bus system design

EAO has extensive experience with on-board micro-controllers. Bus systems are integrated in close collaboration with our customers and industry requirements.

Haptic and tactile design

We use special software for tests and material analysis in order to ensure the optimum tactile feedback characteristics for our HMI Components.



Packing and assembly

EAO offers a comprehensive range of cables and connectors as well as connector mating halves. Customers can select the cable type, cable length, connector type and pin assignment to suit their needs.



Application-specific testing

EAO analyses technical requirements and operating environments, as well as ergonomic and commercial demands, to ensure that users and technologies work in complete harmony.



Product testing and simulation

Using in-house laboratories, environmental chambers, and various methods of analysis, EAO's products are exposed to very harsh conditions and tailored for maximum service life even in challenging environments.



Surface treatments

Our well-founded knowledge of surface treatment for sub-assemblies enables us to provide our customers with expert advice with respect to the characteristics of a huge variety of procedures.



Electrical and mechanical life-cycle testing

In order to meet customers' demands in terms of reliability, continuity and durability, our products and systems are subject to constant quality monitoring using service life testing, optical and x-ray analysis, the finite element method, and more.



Engraving and marking

EAO lenses, text plates and film inserts can be individually marked with text, symbols or pictograms as required. Customers can choose between engraved, printed or laser markings.

EAO manufacturing companies.

With four value-adding partners in Europe, Asia and North America, we are able to offer the following:

- Qualified vendors worldwide
- Consistent multi-location processes
- Integrated quality measures throughout the supply chain



To us, speedy assembly, short delivery times, and secure processing are all part of good customer service – as well as comprehensive production expertise.

Our products possess the key international approvals, and meet all standards and guidelines such as: KBA, IRIS, TSI PRM, IATF, CE, RoHS, REACH, ENEC, CB, UL/UR, ISO, CSA, VDE, CCC, CQC, EAC, DNV GL and many more.





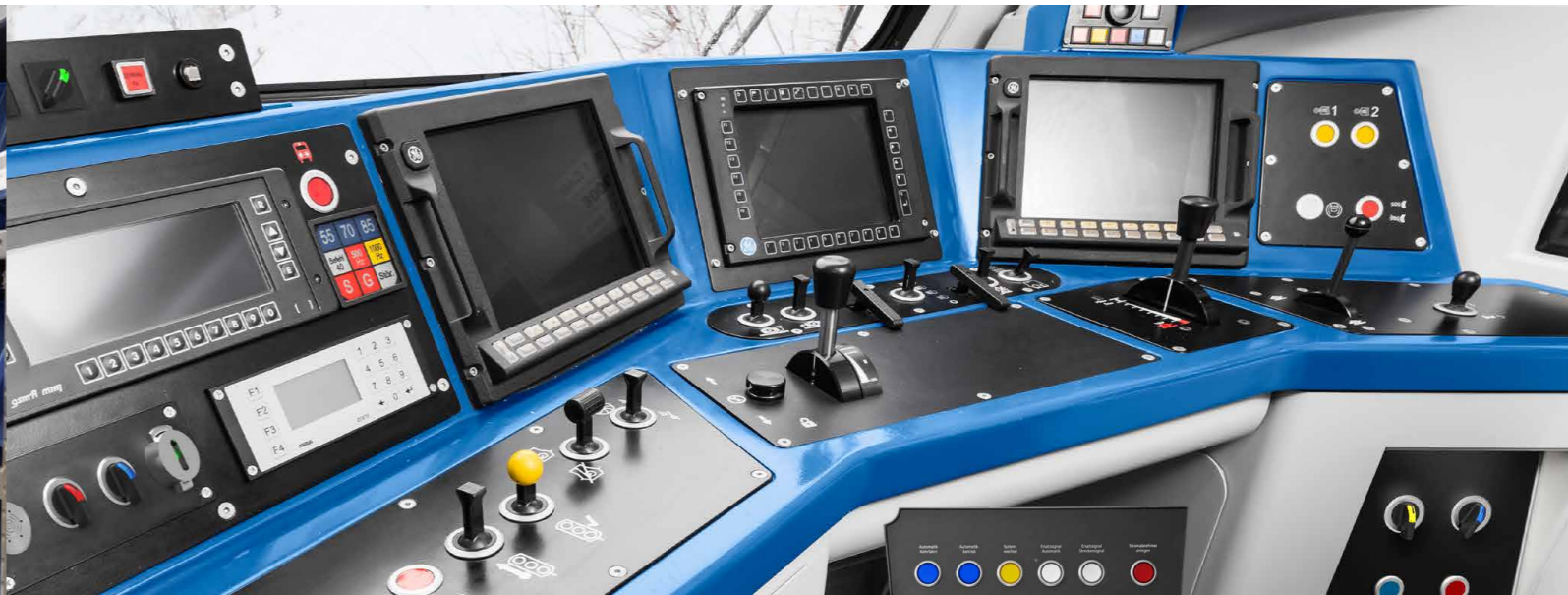
North America
EAO Corporation
Shelton, Connecticut, USA

Overall surface area in square feet	2000
Production and storage space in square feet	1200
Employees	30
Corporate certifications	ISO 9001
Awards	2013 Frost and Sullivan ML100 recipient

Local manufacturing. *Supporting “Buy America”.*

Helps support customer needs for federally defined domestic content requirements.
EAO proudly provides a portfolio of local engineering and manufacturing capabilities to maximize domestic

for Standardization (ISO) 9001:2015, and EAO has a wide range of domestic resources and value-add partners at its disposal to address its rapidly growing demand.



content requirements, and to more effectively support its valued North American customer base.

Requirements for U.S. manufactured ‘Buy America’ content for transit rolling stock procurements are scheduled to increase from 60 percent to more than 70 percent by the year 2020 according to the U.S. Department of Transportation’s (DOT) Federal Transit Administration (FTA) 49 C.F.R. Part 661.

As a solution-focused partner, EAO offers the technical and mechanical customizations of Human Machine Interface (HMI) Components and Systems to meet customers’ specific application requirements. The company’s North American operations are certified in accordance with International Organization

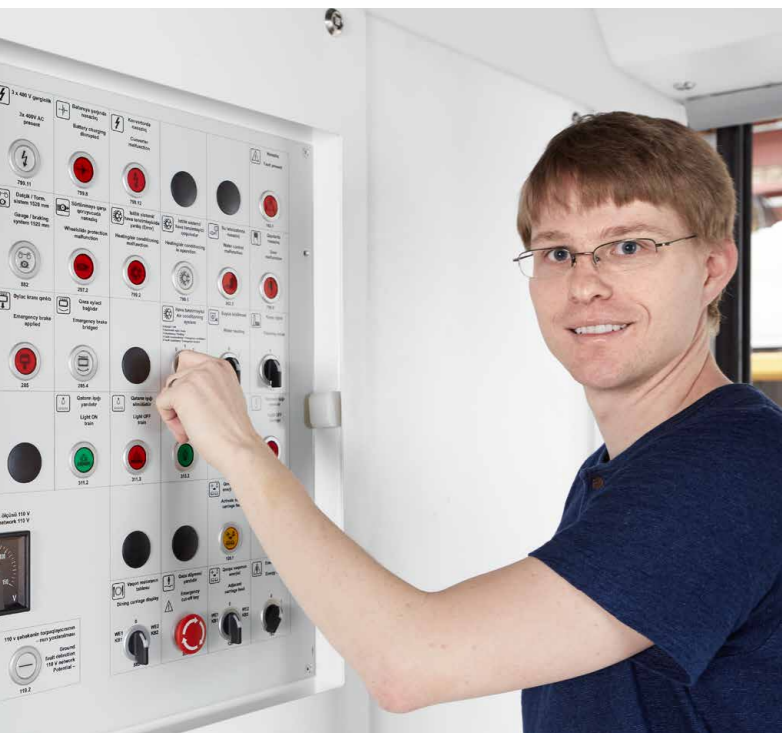


EAO offers the ability to locally optimize engineering, purchasing, production and logistical services. Certified quality management and international acceptance guarantee that all products meet market- and/or country-specific standards, and satisfy any necessary certifications and approvals.

Satisfied customers. *The best kind of reference.*

With fascination and in close cooperation with our customers and business partners, we develop innovative, intuitive and reliable HMI solutions to ensure the highest customer satisfaction – from the initial idea through to implementation and beyond.

EAO HMI products are used all across the world, their impressive performance is appreciated by customers and end-users alike.



ALSTOM

Bode

BOMBARDIER

GE Transportation

IFE

Tetra Pak

CAT

EUCHNER
More than safety.

SIEMENS

MAN

BOSCH

GRAMMER

ABB

LIEBHERR

FEINTOOL

Faiveley
TRANSPORT



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Your center of excellence.

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